

CUSTOMER **Circuit**

SPRING 2017

WESTERN AREA POWER ADMINISTRATION

Technological forefront of energy frontier

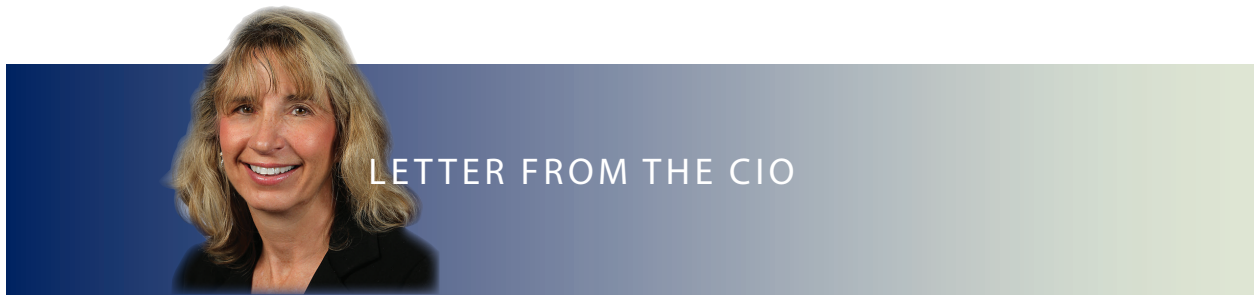
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for 40 years



LETTER FROM THE CIO

by Dawn Roth Lindell

Information technology – the systems, mobile devices, networks, hardware, applications and infrastructure that enable us to quickly and effectively gather and process information – underlies every aspect of work at WAPA. IT team members have transitioned from a support service to a provider of tools embedded in our mission-centric work.

Imagine a day of operating a utility without technology. The same work is much more labor intensive and expensive to achieve. Therefore, keeping our technology in a reliable, secure state is critical. To do so requires continued, ongoing investment.

Just as our cars require oil changes and refills on gasoline, windshield wiper fluid and transmission fluid to stay safe and continue running properly, our hardware, software, mobile devices and network components all require upgrades and security patches. These extend the life of the asset by fixing bugs and vulnerabilities, enhancing security and functionality as well as mitigating unplanned failures. Unfortunately, even with the best care and maintenance, our systems eventually become too outdated to run. The vendors who supply them stop providing the service to the old models.

“KEEPING OUR TECHNOLOGY IN A RELIABLE, SECURE STATE IS CRITICAL. TO DO SO REQUIRES CONTINUED, ONGOING INVESTMENT.”

Technology has continued to evolve with increasing speed and it appears that it will remain on that trajectory. Without updated tools, we are unable to leverage the advantages that technology affords and we risk unplanned outages. We have seen these failures occur at WAPA because we did not have the right processes in place to evaluate our technology assets. At one point, our network failed due to one failed component – a clock that was years past expected life. In another case, over the winter holidays, a 13-year-old server that

was running a power marketing application failed. This server had been overlooked during lifecycle replacement planning.

With the right process, we make planned replacements rather than in response to an expensive, unexpected outage. So we are shifting WAPA’s strategic thinking to focus on making cost-effective, data-driven decisions for how we operate and maintain the bulk electric system and the technology we use to manage it.

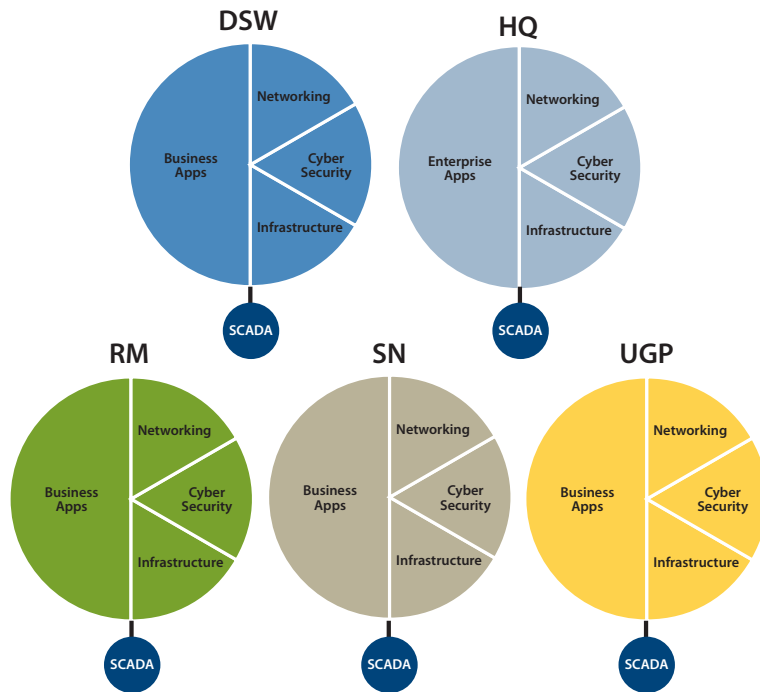
The IT team at WAPA has implemented a robust, forward-looking process to identify all assets and plan for expected lifecycle replacements in the 10-year capital planning cycle. Some additional planning is needed for non-capital components as well. Typical systems will last four to 10 years with proper maintenance and timely upgrades. Our goal is to maximize the investment and to replace prior to failure. This means taking a holistic approach to how we plan, budget, implement and staff our program in partnership with WAPA’s technical functions to provide the best products and service for customers.

Many factors drive additional needs for technology investment, including:

- increasing critical infrastructure regulations from the North American Electric Reliability Corporation
- increasing security tools to both prevent attacks and identify and remove malware quickly
- the organization’s need for additional technology to improve productivity and efficiency across WAPA

Then and Now: IT aligned for optimal program support

5 years ago



Foreign interest in the grid is high, as is the threat of domestic terrorism. With regard to cyber-security, we know that the longer any system is in play, the more likely it is to be successfully hacked. Staying current in our technology is one of our best defenses.

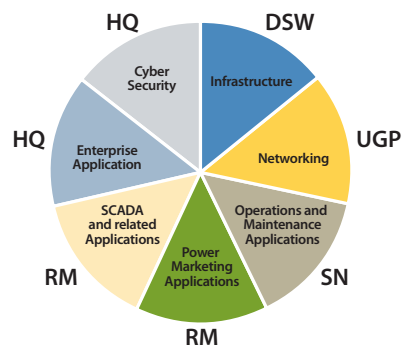
We are working hard to maximize the value of our investments by leveraging our buying power across WAPA, sharing technology resources and cross-training. For example, WAPA improved network security in the field by adding secure enclaves that bolster protection of the organization's operations and customer data through segmented network access. Decisions like updating the network security enclaves account for lifecycle management by implementing a standard tool. With the new enclaves in place WAPA will avoid about \$6.5 million over the next 5 years in maintenance and upgrade costs versus implementing four separate toolsets.

We are here for you. Our IT team remains dispersed throughout our 15-state service territory, with leaders in every region, following one goal and direction, specifically to enable WAPA's mission by delivering technology services that are:

- cost effective
- high quality
- accessible
- innovative
- reliable
- secure

Today

WAPA-wide*



* IT programs integrated WAPA-wide led from various regions.

Serving from multiple locations, our team ensures redundancy in its backup support for the IT program and provides effective planning for the future of WAPA, while maintaining local connectivity for the issues and concerns that matter most to WAPA's customers.

Across Industry

Reliability remains king in the utility industry. WAPA proactively addresses system reliability and contingency planning. When new industry standards arise, staff members work to integrate processes and procedures into WAPA's system to meet both the measure and intent of the new requirements. Using best practices and infusing requirements into WAPA operations strengthens the bulk electric system for our customers and their customers.

Delivering on our mission of marketing federal hydropower throughout 15 states requires us to continually study and analyze operations. We partner with our customers and neighboring utilities with the goal of improving situational awareness for transmission operators and reliability coordinators so they are prepared for a worst-case scenario in real-time conditions.

Reliability

Studying, coordinating operations

Operating the bulk electric system and providing 'round-the-clock energy is a responsibility system operators take seriously. Following the December 2016 Reliability Assurance Project of the Western Interconnection report jointly issued by North American Electric Reliability Corporation and Western Electricity Coordinating Council, WAPA continues to fortify its operational reliability for the 40 million Americans it collectively serves along with its wholesale customers.

WAPA takes proactive measures to support reliability assurance by:

- Moving forward with standing up real-time engineer desks in its Phoenix, Loveland and Watertown dispatch centers. These engineers will perform real-time assessments per the NERC standards every 30 minutes and develop operating plans based on the assessments. The assessments increase situational awareness, pre-mitigate incidents, and prevent instability, uncontrolled separation or cascading outages.
- Using real-time contingency analysis, or RTCA, which runs every 5 minutes looking for possible

issues, i.e., overloads, against all the elements in the network model.

- Having WAPA engineers maintain and update the network models based on sensitivity analyses of the WECC and Southwest Power Pool planning cases versus the impacts to WAPA's and neighboring utilities' facilities.
- Participating in the WECC standardized data-sharing template and the WECC Data Exchange Working Group.
- Strengthening our advanced communication with neighboring utilities to coordinate transmission outages.
- Expanding seasonal assessments beyond the standard transfer capability, to expand the path operator methodology and perform stress tests related to projected system configurations. This allows WAPA to develop pre-contingent mitigation plans to prevent cascading outages and identify long-term interconnection reliability operating limits.

"Of course there is always room for improvement, but I believe WAPA is becoming one of the leaders in these areas," said WAPA's Real-time Engineer Lead Zea Flores.



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~REAL-TIME ENGINEER LEAD ZEA FLORES

Increasing visibility across system

WAPA has followed a systematic approach to network modeling for several years, which ensures its models' accuracy and insight into neighboring systems. WAPA engineers continue to add hundreds of facilities into their models to expand the reach of WAPA's studies.

For example, operations achieved greater insight across the two balancing authorities and visibility into California, as a result of WAPA's operational consolidation for the Western Area Lower Colorado and Western Area Colorado Missouri balancing authorities. Now the operations centers in Loveland and Phoenix can quickly assume control of each other's transmission system in the event of a failure or emergency. And as part of this consolidation the two independent models were merged, enhancing wide-area analysis capability.

The ability for staff at both centers to operate the Supervisory Control and Data Acquisition system creates reinforcement for its operations and more than doubles the transmission operators' and BAs' situational awareness. The consolidation, model merge and computer hardware upgrades allow monitoring

into twice as many of WAPA's neighbors' facilities and simulated contingencies, including a number of smaller generating units that were previously dismissed due to limited computer memory storage. WAPA is simulating events further into our neighboring utility systems.

Additionally, WAPA uses the study results of its reliability coordinators in validating its modeling and evaluating the system. This "two tools" approach strengthens the validity of the independent system studies and allows WAPA operators to analyze discrepancies to ensure the system studies are whole and sound. For instance, operations engineers that manage the WALC and WACM BAs have licenses for Peak Reliability's Real-time Hosted Advanced Applications for the entire West-wide Model. WAPA engineers use these applications to augment the in-house network modeling and enhance real-time modeling efforts.

WAPA continues to partner with neighboring utilities, its reliability coordinators, and customers to increase reliability assurance, maintain a baseline culture of compliance and address complex changes to operating the interconnected bulk electric system.

MRO confirms WAPA's reliability compliance

In March, the Midwest Reliability Organization published its findings from a compliance audit of WAPA's Upper Great Plains region that owns and/or operates nearly 9,000 miles of transmission line and over 200 substations in Montana, North and South Dakota, Nebraska, western Minnesota, western Iowa, and northern Missouri, encompassing about 320,000 square miles of service territory.

The audit, which is performed every three years, found no possible violations or compliance exceptions.

"We are very pleased with the findings of the audit," said WAPA Administrator and CEO Mark A. Gabriel. "WAPA remains committed to using best practices to ensure reliability of the electrical grid."

MRO conducted a compliance audit of WAPA's UGP

system for the time period April 27, 2013, through February 28, 2016. The audit was conducted for MRO and on behalf of Western Electricity Coordinating Council. The audit scope included the applicable Reliability Standards from the 2016 Compliance Monitoring and Enforcement Program.

The primary audit objectives were to:

- Provide reasonable assurance of compliance to the identified applicable Reliability Standards.
- Provide a reasonable basis for all determinations of any findings or conclusions.
- Evaluate and identify the internal controls used by the registered entity for performance measurement(s) within their compliance program.



Technology and Performance

Systems and tools underpin many of the services WAPA provides to its customers. WAPA's technology includes equipment available for customers to check their energy efficiency and its systems for running repayment studies that support the development of customer rates. Learn more about the updates in products and services WAPA offers customers.

Power Repayment Study getting upgrade

WAPA awarded a contract to software development company Utilities International, Inc., on April 5, for a new Power Repayment Study platform that provides a reliable, transparent solution to display the studies for WAPA's rate-setting systems that support its 15 power and transmission projects.

"UII has been an industry leader for over 20 years and offers a proven product that is used by many companies in the utility industry, including some of WAPA's customers," said WAPA Power Marketing Advisor Rodney Bailey, who is leading the PRS software upgrade.

WAPA is replacing its multiple macro-driven and formula-driven platforms with a single PRS software solution that is secure and provides accuracy, transparency and consistency to the WAPA-wide rate and repayment system.

The software upgrade is highlighted in WAPA's refreshed Strategic Roadmap 2024 to ensure the organization can deliver mission-critical customer services in an evolving industry. Specifically, the software upgrade is needed to address four key areas related to WAPA's rates development:

- **Financial compliance** to demonstrate WAPA's PRS integrity and streamline Federal Energy Regulatory Commission filings and government reporting requirements.
- **Cybersecurity** embedded into platform and formulas for tracking and displaying data.



- **Transparency** for customers in a user-friendly format that provides reliable information and the ability to perform "what-if" scenarios.
- **Reduce long-term costs** by operating just one system and allowing staff to focus on rate analysis and development, rather than spending hours verifying the PRS process.

During the next several months, WAPA will be working with UII to standup the new platform and training WAPA staff, with the anticipation of conducting parallel testing on the fiscal year 2017 repayment studies and full productions on the fiscal year 2018 repayment studies.

Learn more about the upgrade

On WAPA's website, customers and other stakeholders interested in WAPA's PRS software upgrade can see customer presentations that give an overview of UII, a breakdown of the upgrade costs and more detailed analysis about the purpose of the PRS project and requirements WAPA was seeking in a commercial off-the-shelf product.

Equipment Loan Program adds new tools

Thanks to your suggestions, WAPA customers can now borrow two new diagnostic tools from the Equipment Loan Program. The electromagnetic field, or EMF, monitor and the Sense Home Energy monitor are easy-to-use meters that provide useful information for both you and your customers.

The U.S. National Institute for Occupational Safety and Health does not consider low-frequency EMFs to be a proven health hazard, but your customers may have concerns about nearby power lines or appliances in their home. You can use the EMF monitor to answer their questions. This device allows you to measure when, for how long and how frequently an appliance or system is emitting EMFs. No special training is needed to use the point-and-shoot tool and it does not store readings to be downloaded.

The Sense Home Energy monitor measures the energy consumption of individual appliances and light fixtures. It connects wirelessly to the user's cell phone to provide data that can help consumers understand their home energy use and take more effective actions to reduce it. The information is stored on the connected cell phone.

As a WAPA customer, you can borrow new monitors and a whole library of other useful tools free of charge. Utilities must pay the cost of return shipping. To schedule an equipment loan, contact Chris Lyles at 720-962-7249. And don't forget to share your story with *Energy Services Bulletin* at energyservices@wapa.gov about how the borrowed tool helped your utility.



EMF monitor



Sense Home Energy monitor

Chris Lyles

Powerful Partnerships for 40 years

On Dec. 21, 1977, high gas prices and an emphasis on conservation led Congress to create the Department of Energy, including Western Area Power Administration—a new agency to sell and deliver hydropower across 15 central and western states.



Now, almost 40 years later, our nation's changing resource generation mix, energy market strategies and continued need for dependable infrastructure make WAPA's mission of maintaining the system and delivering energy all the more crucial to meeting today's energy demands.

Gabriel reflects on powerful partnerships

by Mark A. Gabriel, WAPA Administrator and CEO

April 4 marked my 4th anniversary of leading Western Area Power Administration. In some ways, it feels like I have been here for decades, in other ways, it feels like I arrived yesterday.

This year, as I have spoken with customers, congressional representatives and others, I have focused on the theme of "partnership leads to shared success." I want to make it clear, that this is true for customers and WAPA employees. The work we do at all levels of our organization—making the tough decisions and doing the difficult work—is what drives our success and keeps us well-positioned as our industry evolves. It also keeps our relationships strong, cultivates the skills and expertise of our talented workforce, and breeds innovation.

I have spent the first few months of this year touting WAPA's many successes. I am as inspired as ever by the great work of our staff.

We have faced a significant amount of change and, on the whole, we have taken it in stride. The hard work remains as we continue to deliver on our mission amid

changing and unprecedented times. I am up for the many challenges ahead and am honored to have your continued support and commitment.



East River Board President Jim Ryken and WAPA Administrator and CEO Mark A. Gabriel talk at East River Electric Power Cooperative's Annual Meeting, Sept. 7, in Sioux Falls, South Dakota. Gabriel was a speaker at the event, themed "The Road to New Opportunity." East River Electric is a WAPA firm electric power customer. (Photo courtesy of East River Electric, photographer Jennifer Gross)

The people behind the power scene

Follow WAPA's 40-in-40 campaign

To celebrate WAPA's upcoming 40th anniversary, Dec. 21, the organization is highlighting its most valuable resource: people.

From employees and contractors to customers, tribes and members of Congress, it is the people in public power who collaboratively serve our communities throughout the West. Through a series of weekly interviews between March and December, the "40 People in 40 Weeks" campaign is designed to reflect what WAPA's employees and its partners bring to the electric utility industry.

Each week, WAPA features a unique perspective on its federal services and products, and its influence through the voices of those who work in the field, in the office or use WAPA's services to support their local economies with reliable power.

Already, WAPA has featured:

- Employee: Administrative Assistant Christi Cho
- Customer: General Manager Paul Hauser, Trinity Public Utilities District
- Employee: Asset Management Specialist Jeff Robertson
- Employee: Contract Specialist Tatiana Young
- Employee: Retiree Mike Fisher
- Employee: Maintenance Management Specialist Dorothy Engdahl
- Employee: Electrician Mike Rumbaugh
- Customer: Electric Line Crew Supervisor Jack Lindley, Needles Public Utility Authority

Catch up on WAPA's 40-in-40 campaign by visiting our 40th Anniversary webpage: <http://www.wapa.gov/newsroom/forty/Pages/forty.aspx>

Then follow WAPA on Twitter or LinkedIn to see new features every week!



The Source turns 1

In March, WAPA celebrated the anniversary of its external information resource website, The Source. The website is a dedicated resource for WAPA's customers and stakeholders to find operational data and financial information about the administration.

The Source provides a one-stop shop for WAPA's annual reports, budget allocation, presentations and speeches, regional rates and a searchable index of WAPA's power systems called "By the Numbers." An additional key feature is the comment section, which allows customers to make suggestions for site enhancements directly to WAPA. The site recorded 7,700 sessions generated by 3,700 visitors who viewed more than 20,000 pages during the first year.

"Our goal is to be as transparent as possible and to meet customer needs," said WAPA Administrator and CEO Mark A. Gabriel. "Since March of last year, we have been providing an open source for information to our stakeholders. The Source has been a very successful tool for us to communicate with our customers and for us to review feedback on how to improve."

The Source was part of WAPA's organization-wide website redesign project, which included a major effort to refresh its public site. Both initiatives share the same drivers:

to enhance and expand transparency and improve functionality. Chief Public Affairs Officer Teresa Plant said, "The websites continue to evolve. As part of our mission, we want it to be as easy as possible for our customers and public to have access to key information."

"At WAPA, our core values affirm our commitment to honest actions and foster open communication and feedback," said Gabriel. "We are posting information as quickly as possible. The Source will evolve as users further define what they need."



Connect with us!

WAPA's social channels include Twitter, LinkedIn, Flickr and YouTube

Social media in the utility industry is growing, and WAPA has joined the movement! From photos of our work to deliver federal hydropower safely and reliably to tweets about issues like outages and reliability that matter to customers and the public, WAPA is there to exchange ideas and share the latest happenings and updates from across our 15-state service territory.

Connect with us and see:



Cool photos on Flickr:
<http://www.flickr.com/photos/westernareapower/>



Hot topics on LinkedIn:
<https://www.linkedin.com/company/western-area-power-administration>



Breaking news on Twitter:
[@WesternAreaPowr](https://twitter.com/WesternAreaPowr)



Featured efforts on YouTube:
<https://www.youtube.com/user/WesternAreaPower1>

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